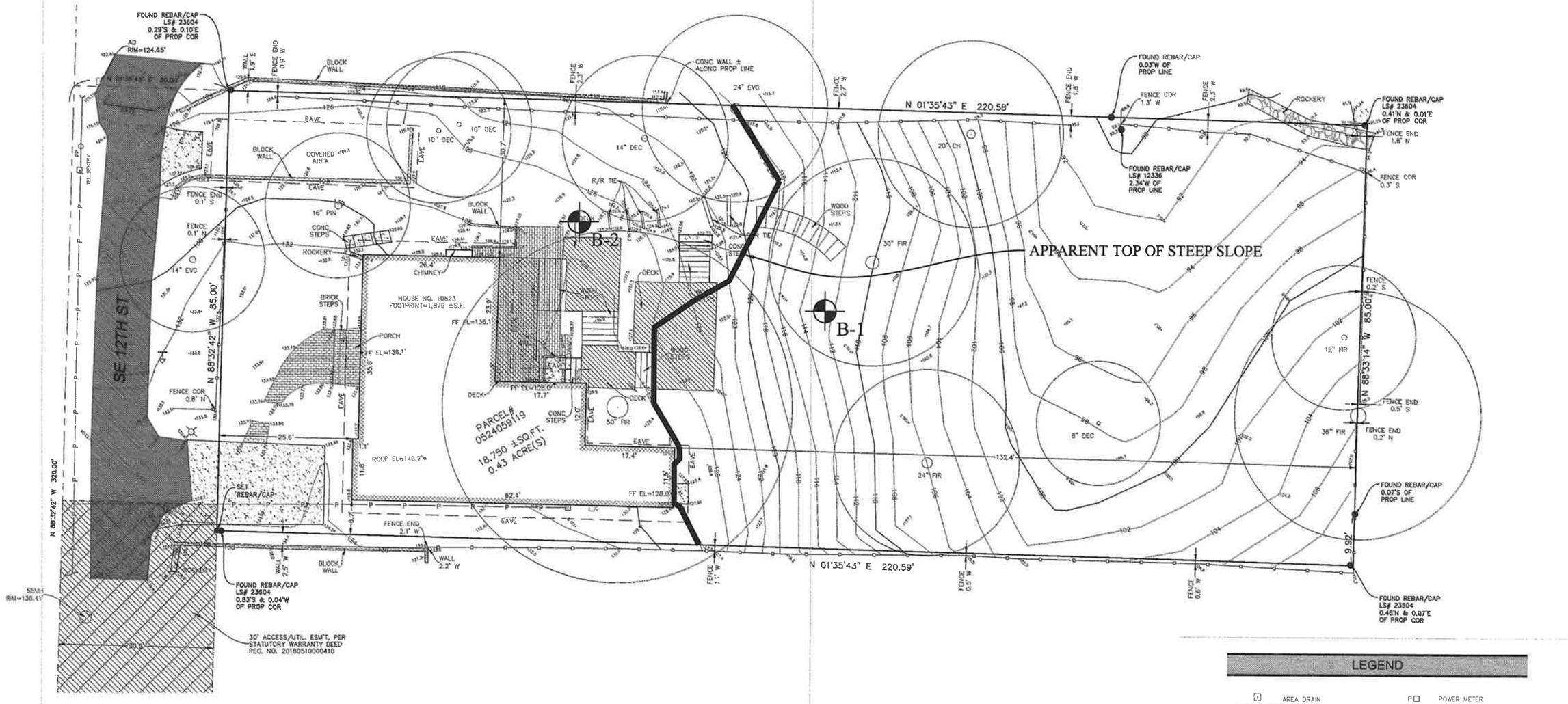


LEGEND

AREA DRAIN	POWER METER
ASPHALT SURFACE	POWER (OVERHEAD)
BRICK SURFACE	POWER POLE
BUILDING	REBAR AS NOTED (FOUND)
CONCRETE SURFACE	REBAR & CAP (SET)
RETAINING WALL	ROCKERY
DECK	SEWER MANHOLE
FENCE LINE (WOOD)	SIGN (AS NOTED)
GAS METER	TELEPHONE SENTRY
GUY ANCHOR	YARD LIGHT
MONUMENT IN CASE (FOUND)	TREE (AS NOTED)
EASEMENT	

BASED UPON TOPOGRAPHIC AND BOUNDARY SURVEY, FORTUNE CLOUD LLC, 10823 SE 12TH ST, BELLEVUE, WA 98004", TERRANE, SHEET 2, 6-14-18.

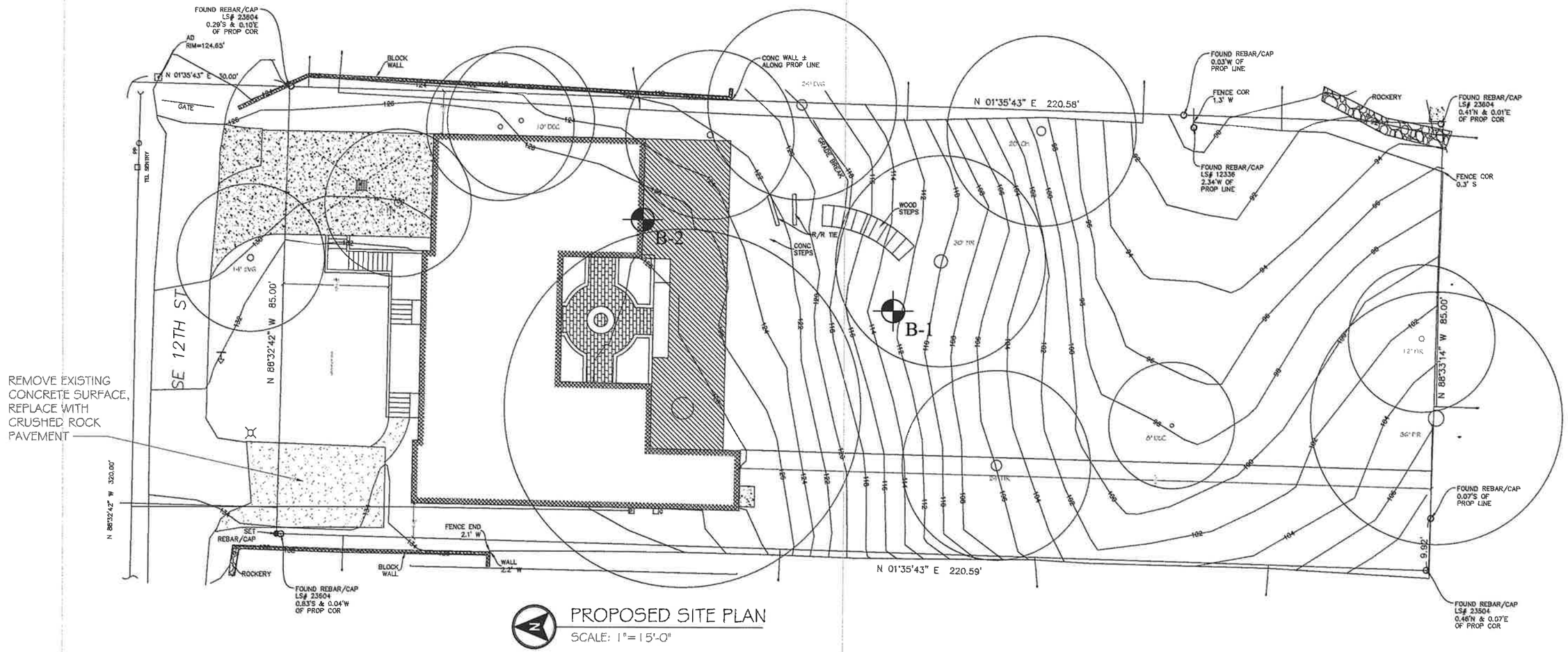
LEGEND

B-1 = BORING NUMBER AND APPROXIMATE LOCATION

GEO Group Northwest, Inc.
13705 Bel-Red Rd, Bellevue, WA 98005
Phone 425/649-8757 FAX 425/649-8758
Email info@geogroupnw.com

TOPOGRAPHIC SURVEY
PROPOSED DEVELOPMENT
10823 SE 12TH ST
BELLEVUE, WASHINGTON

PROJECT #:	G-4808
DATE:	12-11-18
DRAWN:	AG
CHECKED:	WC
SCALE:	~1" = 20'
PLATE:	2



PROPOSED SITE PLAN

SCALE: 1"=15'-0"

BASED UPON "10823 12TH ST SE HOUSE", TECHCRAFT CORP, SHEET A0.1, 7-16-2018.

LEGEND

B-1 = BORING NUMBER AND APPROXIMATE LOCATION

GEO Group Northwest, Inc.

13705 Bel-Red Rd, Bellevue, WA 98005
Phone 425/649-8757 FAX 425/649-8758
Email info@geogroupnw.com

SITE PLAN
PROPOSED DEVELOPMENT
10823 SE 12TH ST
BELLEVUE, WASHINGTON

PROJECT #: G-4808
DATE: 12-3-18
DRAWN: AG
CHECKED: WC
SCALE: ~1" = 20'
PLATE: 3

City of Bellevue Critical Hazards Maps

Introduction | Geologic Hazards | Meteorological Hazards | Human Created Hazards

A geologic hazard is an extreme natural event in the crust of the earth that pose a threat to life and property, for example, earthquakes, volcanic eruptions, tsunamis (tidal waves) and landslides.

Critical Geologic Hazards

Seattle Fault Zone

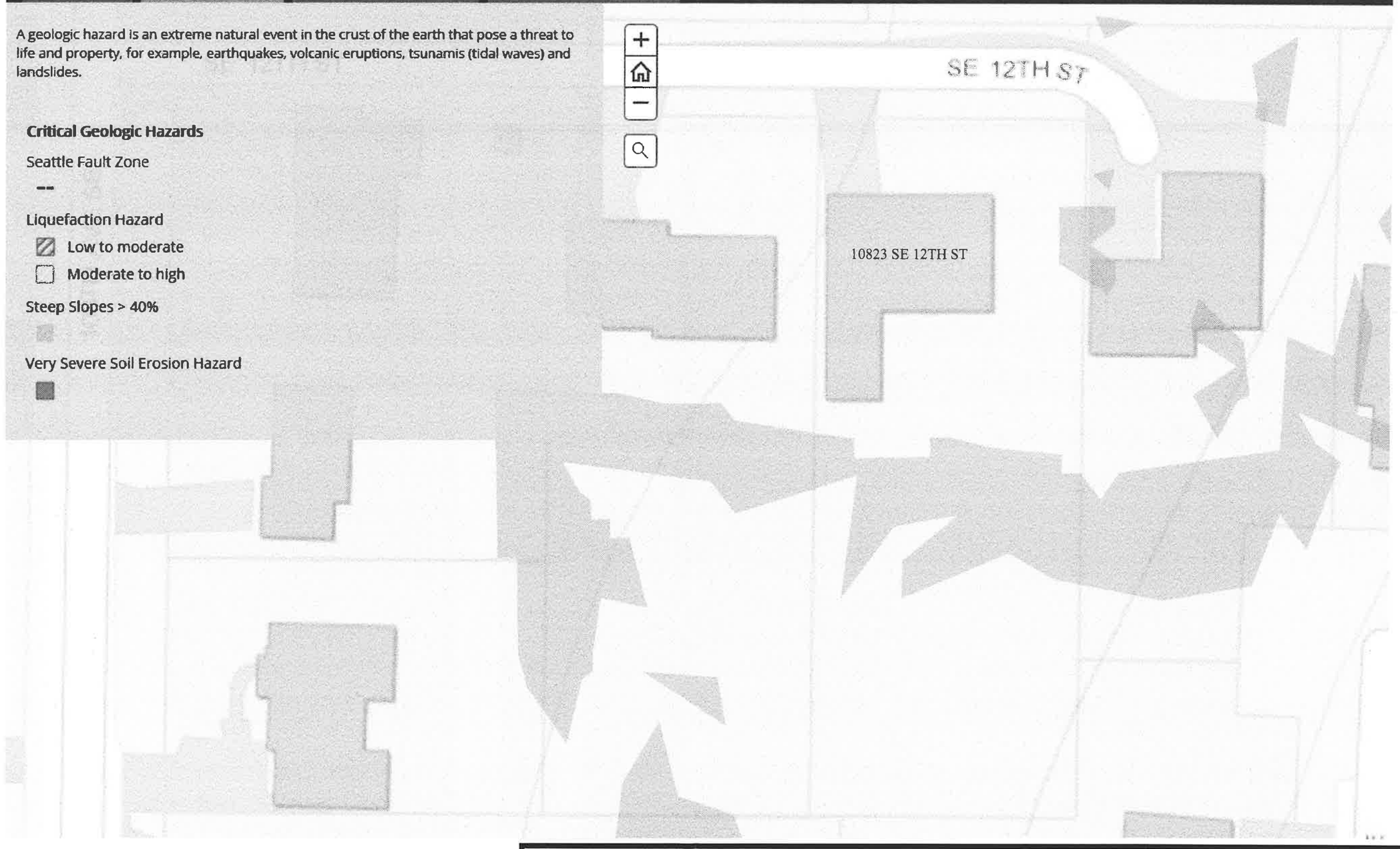
--

Liquefaction Hazard

- [x] Low to moderate
- [ ] Moderate to high

Steep Slopes > 40%

Very Severe Soil Erosion Hazard



BASED UPON THE ONLINE GIS MAPPING BY CITY OF BELLEVUE, DECEMBER 2018.

GEO Group Northwest, Inc.
13705 Bel-Red Rd, Bellevue, WA 98005
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GEOLOGIC HAZARD MAP
PROPOSED DEVELOPMENT
10823 SE 12TH ST
BELLEVUE, WASHINGTON

PROJECT #: G-4808
DATE: 12-4-18
DRAWN: AG
CHECKED: WC
SCALE: NTS
PLATE: 4

GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists & Environmental Specialists

December 11, 2018 G-4808

Mr. Yifang Yang
Foutune Cloud LLC
7231 – 170th Ave SE
Bellevue, WA 98006
c/o Mr. David Lee – david6081@gmail.com

Subject: **GEOTECHNICAL REPORT**
PROPOSED NEW RESIDENCE
10823 SE 12TH ST
BELLEVUE, WASHINGTON

Dear Mr. Yang:

In accordance with our November 9, 2018 contract with you we have prepared the following geotechnical report for the proposed development.

SITE AND PROJECT DESCRIPTION

The project site consists of a developed residential lot, parcel number: 052405-9119 at the subject address as shown on the attached **Plate 1 - Vicinity Map**. The subject site consists of a residential lot currently occupied by a single family residence and detached carport structure. The project survey and site plan refers to the carport-like structure at the northeast portion of the property as a covered area having a block wall at the west and south sides of the area. The residence is a one-story building with daylight basement which daylights toward the south. A relatively extensive multiple-level wood deck is located at the south side of the existing residence. The residence is located at the top of a south-facing moderate to steep slope area having a maximum height of around 26-feet.

The existing site conditions are shown on the attached **Plate 2 – Topographic Survey**. Based upon the survey the south-facing moderate to steep slope area has slope inclinations ranging from 37 to 54 percent from the horizontal. At the toe of this slope area there is an east-facing gently sloping gully with northeast facing moderate slopes at the very far south portion of the property.

Based upon information provided by the designer, Techcraft Corporation, the existing residence is proposed to be demolished leaving the existing foundations and concrete basement retaining walls in place. A new residence will be constructed with much of the building being constructed on top of the existing foundation. The new building footprint will be expanded at the east and at the northeast sides of the existing building creating a new east wing. At these areas we understand that new foundations will be constructed. A new deck will be constructed at the south side of the building and a courtyard will be developed at the space between the new east and west wings of the house. A garage will be constructed at the main floor level at the new east wing for the house. The proposed development is shown on the attached **Plate 3 – Site Plan**.

GEOLOGIC CONDITIONS

The geologic map[1] for the site indicates that the subject lot is underlain by Quaternary aged Vashon Till (Qvt). These deposits consist of a mixture of silt, sand and gravel which was deposited by glacial ice during the most recent period of glaciation. These deposits were overridden by glacial ice. Therefore the un-weathered portion of these deposits is typically dense to very dense. The geologic map does not indicate the presence of landslide deposits, scarps or associated features at or in close proximity to the subject site.

SUBSURFACE CONDITIONS

GEO Group Northwest explored the subsurface soil and groundwater conditions by drilling two borings labeled B-1 and B-2 at the site on November 30, 2018. Boring B-1 was drilled at the moderate to steep south-facing slope area just south of the existing decks. Boring B-2 was drilled adjacent to the east side of the existing deck at the south side of the residence. The approximate boring locations are shown on the attached **Plate 2 – Topographic Survey** and **Plate 3 – Site Plan**. The borings were drilled by limited access hand-carried hollow-stem auger drill rig and sampled via the Standard Penetration Test (SPT) method. Soil samples were collected at regular intervals and the observed soils were logged by an engineer from our office.

The soils encountered at the borings consist of very loose to loose sandy SILT and silty SAND with varying amounts of gravel and some organic matter and wood/roots overlying medium dense to very dense soils at depths ranging from 2 to 3-feet below ground surface (bgs). The underlying stable and competent medium dense to very dense soils appear to be the anticipated Vashon Till geologic unit and the depth to this soil layer is anticipated to be at 2 to 4-feet below ground surface.

[1] "Geologic Map of King County", ESS, UW, GeoMapNW, Booth et. al., March 2007.

At both boring locations groundwater seepage was not encountered. It is important to note that groundwater seepage conditions may change throughout the year and may also change due to land use changes.

The results of our subsurface investigation are shown on the attached **Appendix A – Boring Logs and USCS Soil Legend.**

EXISTING RESIDENCE CONDITION

Based upon the King County Property records the subject site residence was constructed in 1948. At the time of our subsurface investigation at the site we viewed the current conditions at the existing residence, both at the interior and exterior. The interior of the house is apparently in the process of being remodeled as much of the drywall has been removed, some apparent new framing is in place and there are open excavations within the basement. It appears that a below slab subsurface drainage system is in the process of being installed at the north side of the building basement. Ponded apparent groundwater seepage was observed at an estimated depth of 1-foot below the existing slab at the west side of the existing basement area. Soils observed at the excavated areas consist of gray dense fine sandy SILT and silty SAND which appears to be the un-weathered Vashon Till. We used a laser level to check the existing main floor condition. Based upon the laser level measurements the floor surfaces appear mostly level. No significant cracks were observed at the existing visible basement concrete retaining walls and concrete stem walls. There also is no apparent cracking at the brick chimney located at the east side of the building. Based upon the presence of dense soils observed within the basement excavations, the relatively level condition of floors and the absence of wall cracking it appears that the house has performed well with regard to settlement and the footings may be founded on top of the competent soils.

GEOLOGIC HAZARD AREAS

GEO Group Northwest has reviewed the City of Bellevue Land Use Code Part 20.25H Art. VII – Geologic Hazard Areas with regard to the subject project. We have also reviewed the online GIS mapping provided by Bellevue and prepared the attached **Plate 4 – Geologic Hazard Map** based upon this information. The mapping indicates that an area of Geologic Hazard Steep Slopes is located just to the south of the existing house.

Steep slopes, those slopes having inclinations of 40 percent or steeper qualify as Geologic Hazard Areas when the slope height is 10-feet or greater and the slope area exceeds 1000 square feet. Based upon our review of the site topography there are steep slope inclinations at the

subject property. It appears that the west wing of the existing house is located at the top of the steep slope area having no buffer or setback. Based upon the provided topography a portion of the existing deck encroaches into the apparent steep slope area. We recommend that the project site plan is modified to delineate the steep slope associated Geologic Hazard area. We have delineated the apparent top of the steep slope area as shown on **Plate 2 – Topographic Survey** based upon the provided topography and a minimum 10-foot steep slope height.

Geologic Hazard Areas are designated according to the following (20.25H):

A. Designation of Critical Areas. The following geologic hazard areas are hereby designated critical areas subject to the regulations of this part:

1. Landslide Hazards. Areas of slopes of 15 percent or more with more than 10 feet of rise, which also display any of the following characteristics:

a. Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides.

b. Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits.

c. Slopes that are parallel or subparallel to planes of weakness in subsurface materials.

d. Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes.

e. Areas with seeps indicating a shallow ground water table on or adjacent to the slope face.

f. Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.

2. Steep Slopes. Slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.

3. Coal Mine Hazards. Areas designated on the Coal Mine Area Maps or in the City's coal mine area regulations, LUC 20.25H.130, as potentially affected by abandoned coal mines; provided, that compliance with the coal mine area regulations shall constitute compliance with the requirements of this chapter in regard to coal mines.

4. Seismic Hazards. Areas of known faults or Holocene displacement, based on the most up-to-date information, or areas mapped areas of "moderate to high" or "high" hazard liquefaction

susceptibility by the Washington Department of Natural Resources Liquefaction Susceptibility Map of King County, Washington, 2004, as amended.

At the time of our subsurface exploration at the site we did not observe the presence of scarps, slumps, erosion or other landslide related features at the subject site slope areas. Additionally there were no seeps observed at the sloping areas and at the borings. Based upon our subsurface exploration the underlying soils are stable glacial till soils. In summary, it appears that the site steep slopes are stable.

Based upon our review of the GIS, available information regarding the site vicinity as well as our observations the subject site does not contain Geologic Hazard Areas defined as Landslide Hazards, Coal Mine Hazards or Seismic Hazards.

The proposed expansion of the existing building footprint appears to be in general roughly parallel to the steep slope area, thereby not decreasing the existing buffer from the top of the steep slope. The proposed deck will remove the currently existing encroachment into the steep slope area. Provided that the building foundations are bearing on the competent medium dense to very dense site soils then it is our opinion that proposed development is acceptable with regard to steep slope buffers which are less than the code specified 50-feet for new development. We understand that the portion of the building and deck structure which is new will have virtually zero buffer or setback, however, the existing steep slope encroachment (existing south portion of the deck) is being removed. It is our opinion that the proposed development may have zero setback or buffer from the steep slope provided that all new building foundations are bearing on top of the competent medium dense glacial till soils, that GEO Group Northwest is retained to verify bearing soil conditions at all new foundations (at the time of construction) and that no site stormwater is discharged to the steep slope area.

SEISMIC EVALUATION AND DESIGN CRITERIA

Based upon the subsurface investigation it is our opinion that the overlying 100-foot thickness of soils at the project site may be characterized as Site Class C soil (Very Dense Soil and Soft Rock) and may be designed accordingly for seismic loads per the IBC. According to the online USGS Seismic Hazard tool the seismic coefficients are as follows:

$S_s = 1.335g$ $S_1 = 0.514g$

CONCLUSIONS AND RECOMMENDATIONS

Based upon our subsurface investigation the proposed development is acceptable for the subject site soil conditions. We recommend that the new building is constructed to bear on the underlying competent medium dense to dense site soils and that all foundation subgrades are approved by GEO Group Northwest at the time of construction, prior to the foundation pour(s). If loose soils are encountered at building foundation locations then a program of over-excavation and replacement with compacted structural fill shall be implemented and approved by GEO Group Northwest. Based upon our subsurface investigation and the assumed floor elevation similar to the existing building it is anticipated that over-excavation may be necessary at some portions of the new building foundation area. We recommend that GEO Group Northwest is retained to view the prepared foundation subgrades at the time of construction in order to verify that they consist of the competent native soils or that over-excavation and structural fill placement are acceptable and are placed on top of the competent soils.

Provided that the building foundations are bearing on the competent medium dense to very dense site soils then it is our opinion that proposed development is acceptable with regard to steep slope buffers which are less than the code specified 50-feet for new development.

We recommend that the following recommendations and design parameters be incorporated into the design for the development.

Site Preparation and General Earthwork

The proposed development areas should be stripped and cleared of surface vegetation and organic soils (topsoil).

Silt fences should be installed around areas disturbed by construction activity to prevent sediment-laden surface runoff from being discharged off-site. Exposed soils that are subject to erosion should be compacted and covered with plastic sheeting.

Temporary Excavation Slopes and Permanent Slopes

Under no circumstances should temporary excavation slopes be greater than the limits specified in local, state and national government safety regulations. Temporary cuts greater than four feet in height should be sloped at an inclination no steeper than 1H:1V (Horizontal:Vertical) in the overlying very loose to medium dense site soils. If seepage is encountered at the excavation, then temporary slopes should have inclinations of no steeper than 2H:1V.

It is assumed that the new building will have a lowest floor level elevation which is equal to the existing lowest floor level elevation (elevation 128) and that much of the existing foundation and concrete basement walls will remain in place. Accordingly it is anticipated that there are no proposed temporary excavations which will fall below a 1H:1V plane projected from the property lines.

At areas where grading is to occur permanent slopes shall be sloped no steeper than 3H:1V. Where slopes are steeper than 4H:1V we recommend compacting the finish grades, installing jute netting at the ground surface and planting the sloping areas with appropriate drought-tolerant native vegetation in order to mitigate the risk of erosion.

Structural Fill

All fill material used to achieve design site elevations below the building areas and below non-structurally supported slabs, parking lots, sidewalks, driveways, and patios, should meet the requirements for structural fill. During wet weather conditions, material to be used as structural fill should have the following specifications:

1. Be free draining, granular material containing no more than five (5) percent fines (silt and clay-size particles passing the No. 200 mesh sieve);

2. Be free of organic material and other deleterious substances, such as construction debris and garbage;

3. Have a maximum size of three (3) inches in diameter.

All fill material should be placed at or near the optimum moisture content. The optimum moisture content is the water content in soil that enables the soil to be compacted to the highest dry density for a given compaction effort.

Based upon our subsurface investigation the overlying site soils consist of silty soils. These soils are not recommended for use as structural fill during periods of wet weather due to their moisture sensitivity and related anticipated difficulty in achieving compaction requirements. We recommend that the contractor take measures to protect the site soils from wet weather impacts such as using plastic sheeting to cover stockpiles if an attempt is made to use site soils as fills. Alternatively, and if there is not sufficient room to store excavated soils, than it may be beneficial to import a granular fill material meeting the specifications noted above.

Structural fill should be placed in thin horizontal lifts not exceeding ten inches in loose thickness. Structural fill under building areas (including foundation and slab areas), should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM Test Designation D-1557-91 (Modified Proctor).

Structural fill under driveways, parking lots and sidewalks should be compacted to at least 90 percent maximum dry density, as determined by ASTM Test Designation D-1557-91 (Modified Proctor). Fill placed within 12-inches of finish grade should meet the 95% requirement.

We recommend that GEO Group Northwest, Inc., be retained to evaluate the suitability of structural fill material and to monitor the compaction work during construction for quality assurance of the earthwork.

Spread Footing Foundations

The proposed new building foundations may consist of conventional spread footings bearing on top of the underlying medium dense to dense competent site soils or compacted structural fill placed on top of these soils. Loose soils present settlement related risks to the foundations. Therefore either these soils must be removed or compacted and approved by the geotechnical engineer. If very loose or loose soils are encountered at the foundation subgrades then over-excavation will be necessary to expose the underlying competent medium dense to very dense site soils. Based upon our subsurface investigation the competent medium dense soils are anticipated at levels between 2 and 4-feet below the ground surface. Over-excavation may be required at some areas. We recommend that all foundation subgrades are approved by GEO Group Northwest at the time of construction.

Individual spread footings may be used for supporting columns and strip footings for bearing walls. Our recommended minimum design criteria for foundations bearing on the medium dense to dense competent site soils or on compacted structural fill placed on top of these soils are as follows:

- Allowable bearing pressure, including all dead and live loads
  - Medium dense to dense soils = 2,000 psf
  - Compacted structural fill on top of the medium dense to dense soils = 2,000 psf

- Minimum depth to bottom of perimeter footing below adjacent final exterior grade = 18 inches
- Minimum depth to bottom of interior footings below top of floor slab = 18 inches
- Minimum width of wall footings = 16 inches
- Minimum lateral dimension of column footings = 24 inches
- Estimated post-construction settlement = 1/4 inch
- Estimated post-construction differential settlement; across building width = 1/4 inch

A one-third increase in the above allowable bearing pressures can be used when considering short-term transitory wind or seismic loads.

Lateral loads can also be resisted by friction between the foundation and the supporting compacted fill subgrade or by passive earth pressure acting on the buried portions of the foundations. For the latter, the foundations must be poured "neat" against the existing undisturbed soil or be backfilled with a compacted fill meeting the requirements for structural fill. Our recommended parameters are as follows:

- Passive Pressure (Lateral Resistance)
  - 350 pcf equivalent fluid weight for compacted structural fill
  - 350 pcf equivalent fluid weight for native dense soil.

- Coefficient of Friction (Friction Factor)
  - 0.35 for compacted structural fill
  - 0.35 for native dense soil

Conventional Retaining Walls and Basement Walls

The project plans do not indicate whether any new concrete retaining walls are proposed. We understand that the existing basement configuration retaining walls will remain in place. If conventional concrete retaining walls are necessary then we recommend their design and construction in accordance with the following section.

Permanent retaining walls restrained horizontally on top (such as basement walls) are considered unyielding and should be designed for a lateral soil pressure under the at-rest condition; while conventional reinforced concrete walls free to rotate on top should be designed for an active lateral soil pressure.

Active Earth Pressure
Conventional reinforced concrete walls that are designed to yield an amount equal to 0.002 times the wall height, should be designed to resist the lateral earth pressure imposed by an equivalent fluid with a unit weight of 30 pcf for level backfill.

At-Rest Earth Pressure
Walls supported horizontally by floor slabs are considered unyielding and should be designed for lateral soil pressure under the at-rest condition. The design lateral soil pressure should have an equivalent fluid pressure of 40 pcf for level backfill.

Seismic Surcharge
For the anticipated 100 year seismic event a horizontal surcharge load of 6H psf should be applied;

Passive Earth Pressure
350 pcf equivalent fluid weight for compacted structural fill and native undisturbed soil;

Base Coefficient of Friction
0.35 for compacted structural fill and native undisturbed soil;

To prevent the buildup of hydrostatic pressure behind permanent concrete basement or conventional retaining walls, we recommend that a vertical drain mat, such as Miradrain 6000 or equivalent, be used to facilitate drainage behind such walls. The drain mat core should be placed against the wall(s) with the filter fabric side facing the backfill. The drain mat should extend from near the finished surface grade down to the footing drain system. Additionally all backfill placed between the excavation slopes or temporary shoring and the new basement/retaining walls should consist of free-draining fills having less than 5% passing the No. 200 sieve. Also, a waterproofing layer should be placed between the drainage mat layer and the concrete wall, for moisture protection at all basement wall locations.

The top 12 inches of backfill behind retaining or basement walls should consist of compacted and relatively impermeable soil. This cap material can be separated from the underlying more granular drainage material by a geotextile fabric, if desired. Alternatively, the surface can be

sealed with asphalt or concrete paving. Where possible the ground surface should be sloped to drain away from the wall.

GEO Group Northwest, Inc., recommends that backfill material which will support structures or improvements (such as patios, sidewalks, driveways, etc.) behind permanent concrete retaining walls and basement walls be placed and compacted consistent with the structural fill specifications in the **Structural Fill** section of this report.

Drainage Considerations

As noted in the "Existing Residence Condition" section of this report we observed at the time of our investigation that apparent subsurface piping is in the process of being installed within the existing basement. At an excavation within the west wing of the existing basement a ponded water level was observed at a depth around 1-foot below the existing slab elevation. At all areas where the existing basement retaining walls are to remain in place and no new subsurface drainage measures are proposed at the exterior of these walls, we recommend that a subsurface drain be installed below the slab adjacent to the existing retaining walls. The subsurface drain should consist of a 4-inch minimum diameter rigid perforated PVC pipe laid in a bed of washed gravel and surrounded with a layer of filter fabric. The perforated drainage pipes should be tightlined to the stormwater system.

We recommend that footing drains be constructed at the perimeter of the new foundation and at the base of all retaining walls. Footing drains are recommended to consist of a minimum 4-inch diameter perforated rigid PVC pipe laid in a bed of gravel and surrounded with gravel and separated from finer grained material with a layer of filter fabric. The footing drain pipes should be tightlined to the stormwater drainage system and downspout drains shall not drain into the footing drain piping.

Drainage pipes shall not discharge at the steep slope area.

Slab-on-Grade Concrete Floors

Slab-on-grade concrete floors may be constructed directly on top of the competent medium dense to very dense in-situ site soils or on top of compacted structural fills placed on top of the competent site soils provided that the subgrade is not yielding at the time of concrete pour. Slab-on-grade floors should not be constructed on top of the overlying loose soils or on top of wet yielding soils. We recommend that we are retained to observe the condition of the slab subgrades prior to the pour to verify that they consist of medium dense soils and are non-

yielding. Over-excavation and replacement with compacted structural fill may be necessary if loose or yielding soils are encountered at the slab subgrade. If structural fills are to be placed at these areas then they should be compacted in accordance with the specifications in the section titled: **Structural Fill**.

To avoid moisture build-up on the subgrade, slab-on-grade concrete floors should be placed on a capillary break, which is in turn placed on the prepared subgrade. The capillary break should consist of a minimum of a six (6) inch thick layer of free-draining crushed rock or gravel containing no more than five (5) percent finer than the No. 4 sieve.

To reduce moisture vapor transmission through the slab we recommend installing a minimum 10-mil thick vapor retarder, such as Moistop Ultra® 10, by Fortifiber Building Systems Group®, between the capillary break and concrete floor slab. Moistop Ultra 10 is a polyolefin film with a water vapor permeance of 0.02 perms. It is puncture and tear resistant, meets ASTM E-1745 Class A, B and C requirements for underslab vapor retarders and is suitable for residential and commercial applications. Boots are available for sealing around pipes, conduit and other penetrations. We recommend these be installed in accordance with the manufactures recommendations.

ADDITIONAL SERVICES

We recommend that GEO Group Northwest Inc. be retained to perform a general plan review of the final design and specifications for the proposed development to verify that the earthwork and foundation recommendations have been properly interpreted and implemented in the design and in the construction documents. We also recommend that GEO Group Northwest Inc. be retained to provide monitoring and testing services for geotechnically-related work during construction. This is to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. We anticipate that geotechnical construction monitoring inspections may be necessary for the following construction tasks:

1. Soil bearing verification for foundation subgrades;
2. Structural fill placement and compaction;
3. Subsurface drainage installation;
4. Slab-on-grade floor subgrade preparation observation/approval.

LIMITATIONS

This report has been prepared for the specific application to this site for the exclusive use of Foutune Cloud LLC and their authorized representatives. Any use of this report by other parties is solely at that party's own risk.

Our findings and recommendations stated herein are based on field observations, our experience and judgement. The recommendations are our professional opinion derived in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area and within the budget constraint. No warranty is expressed or implied. In the event that soil conditions not anticipated in this report are encountered during site development, GEO Group Northwest, Inc., should be notified and the above recommendations should be re-evaluated.

If you have any questions please do not hesitate to contact us.

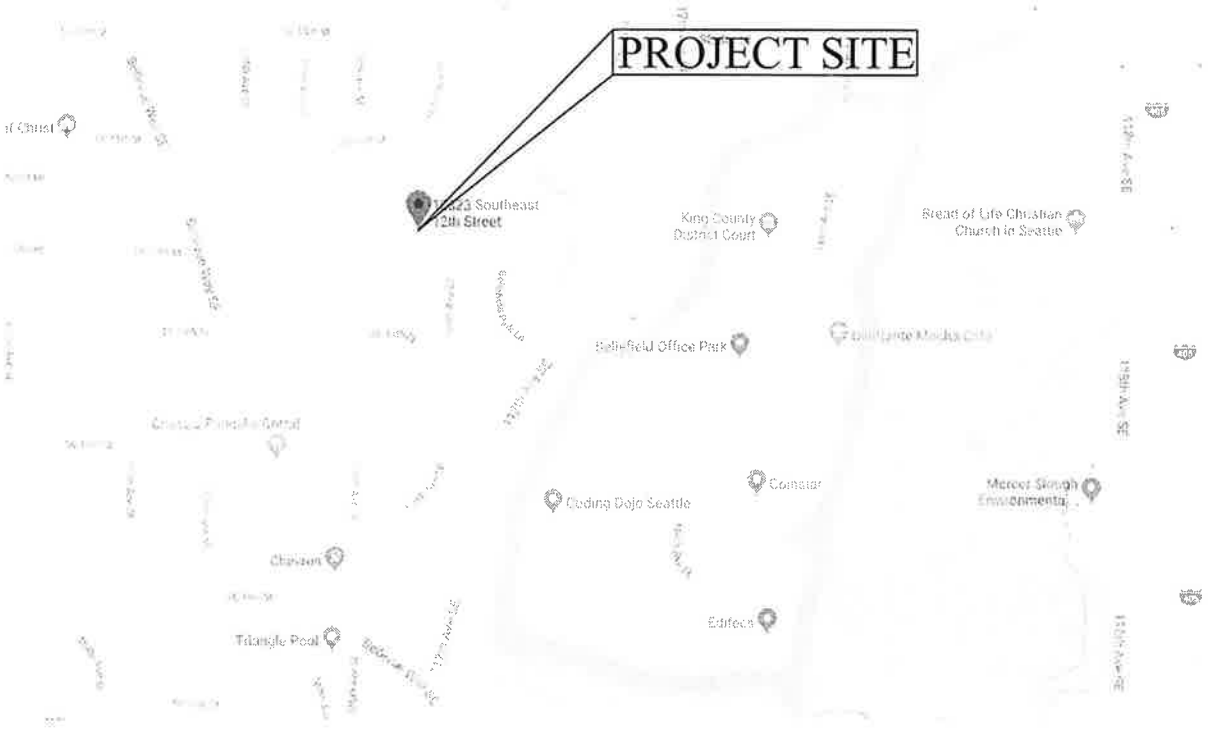
Sincerely,
GEO GROUP NORTHWEST, INC.

Adam Gaston
Project Engineer

William Chang, P.E.
Principal

Attachments:
Plate 1 – Vicinity Map
Plate 2 – Topographic Survey
Plate 3 – Site Plan
Plate 4 – Geologic Hazard Map

Appendix A – Boring Logs and USCS Soil Legend



GEO Group Northwest, Inc.
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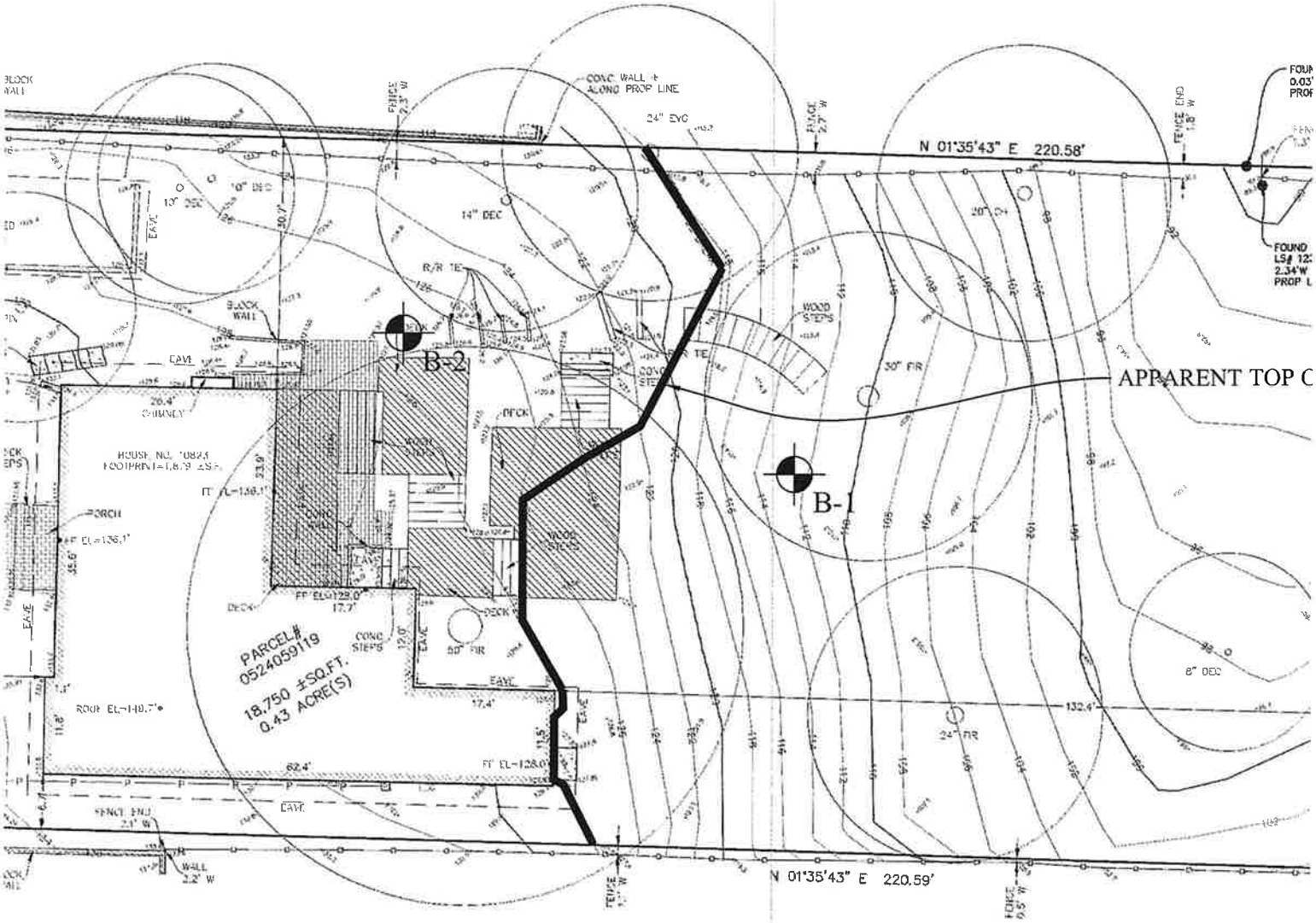
Phone 425/649-8757 FAX 425 649-8758
Email info@geogroupnw.com

VICINITY MAP

10823 SE 12TH ST
BELLEVUE, WASHINGTON

SCALE: NTS	DATE: 12-3-18	MADE: AG	JOB NO.: G-4808	PLATE: 1



JMBER AND APPROXIMATE LOCATION

GEO Group Northwest, Inc.
13705 Bel-Red Rd, Bellevue, WA 98005
Phone 425/649-8757 FAX 425/649-8758
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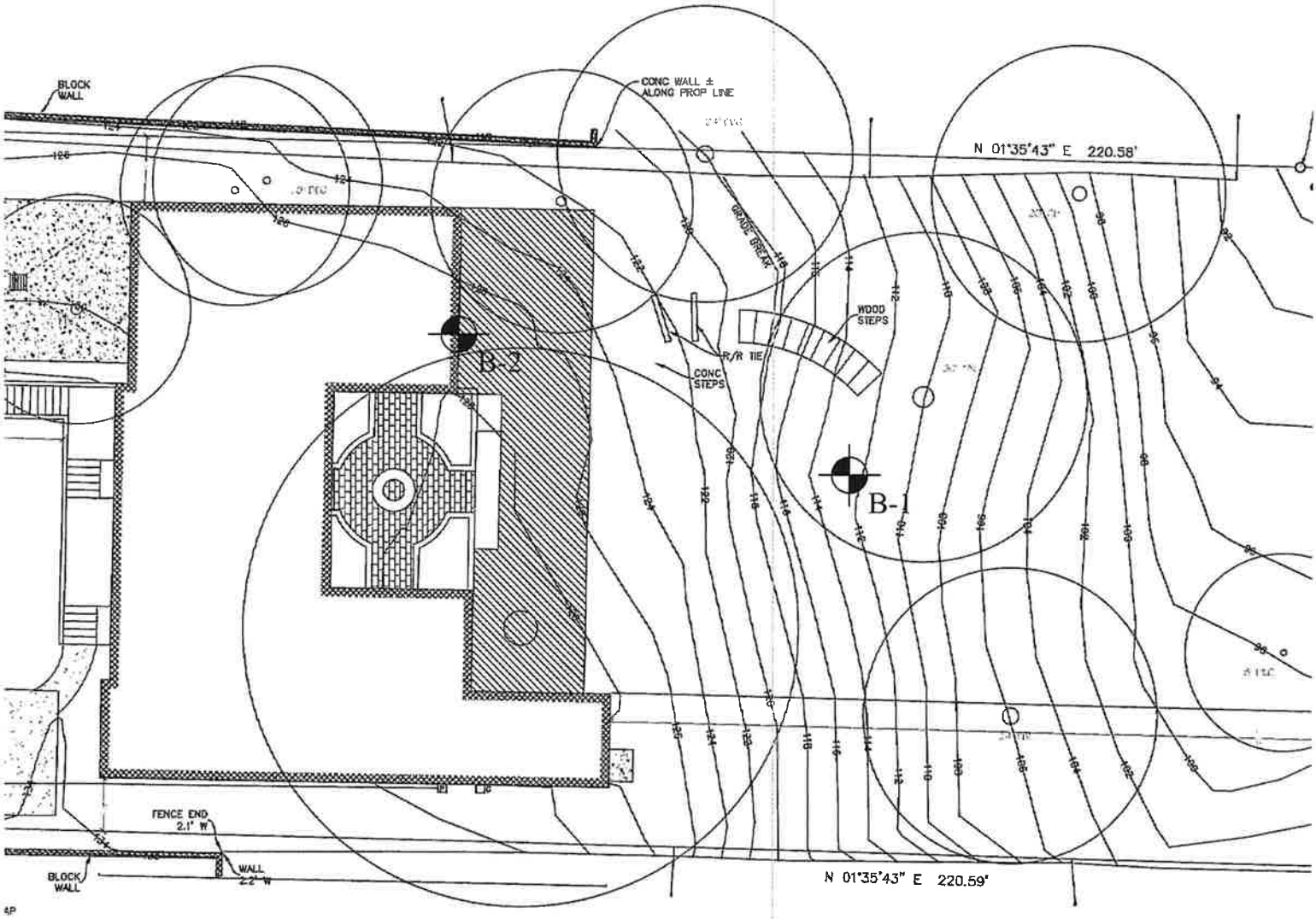


PROPOSED SITE PLAN

SCALE: 1"=15'-0"

JMBER AND APPROXIMATE LOCATION

GEO Group Northwest, Inc.
13705 Bel-Red Rd, Bellevue, WA 98005
Phone 425/649-8757 FAX 425/649-8758
Email info@gcogroupnw.com

SITE PL
PROPO
10823 S
BELLE

l Hazards Maps

Meteorological Hazards | Human Created Hazards

t in the crust of the earth that pose a threat to
volcanic eruptions, tsunamis (tidal waves) and

10823 SE 12TH ST

1BER 2018.

GEO Group Northwest, Inc.
13705 Bel-Red Rd, Bellevue, WA 98005
Phone 425/649-8757 FAX 425/649-8758
Email info@geogroupnw.com

GEOLO
PROPO
10823 S
BELLE

APPENDIX A

BORING LOGS AND USCS SOIL LEGEND

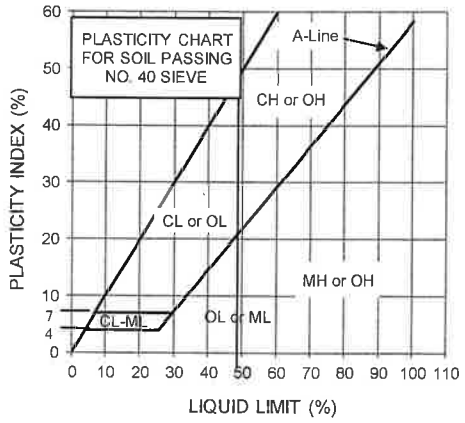
G-4808

LEGEND OF SOIL CLASSIFICATION AND PENETRATION TEST

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION
COARSE-GRAINED SOILS More Than Half by Weight Larger Than No. 200 Sieve	GRAVELS (More Than Half Coarse Grains Larger Than No. 4 Sieve)	CLEAN GRAVELS (little or no fines)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURE, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES LITTLE OR NO FINES
		DIRTY GRAVELS (with some fines)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More Than Half Coarse Grains Smaller Than No. 4 Sieve)	CLEAN SANDS (little or no fines)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LIITLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		DIRTY SANDS (with some fines)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS More Than Half by Weight Smaller Than No. 200 Sieve	SILTS (Below A-Line on Plasticity Chart, Negligible Organic)	Liquid Limit < 50%	ML	INORGANIC SILTS, ROCK FLOUR, SANDY SILTS OF SLIGHT PLASTICITY
		Liquid Limit > 50%	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOIL
	CLAYS (Above A-Line on Placticity Chart, Negligible Organic)	Liquid Limit < 30%	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, CLEAN CLAYS
		Liquid Limit > 50%	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
	ORGANIC SILTS & CLAYS (Below A-Line on Placticity Chart)	Liquid Limit < 50%	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
		Liquid Limit > 50%	OH	ORGANIC CLAYS OF HIGH PLASTICITY
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

LABORATORY CLASSIFICATION CRITERIA		
DETERMINE PERCENTAGES OF GRAVEL AND SAND FROM GRAIN SIZE DISTRIBUTION CURVE	Cu = (D60 / D10) greater than 4 Cc = (D302) / (D10 * D60) between 1 and 3	
	NOT MEETING ABOVE REQUIREMENTS	
COARSE GRAINED SOILS ARE CLASSIFIED AS FOLLOWS:	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE, or P.I. LESS THAN 4
		ATTERBERG LIMITS ABOVE "A" LINE, or P.I. MORE THAN 7
	Cu = (D60 / D10) greater than 6 Cc = ($D30^2$) / (D10 * D60) between 1 and 3	
< 5% Fine Grained: GW, GP, SW, SP	NOT MEETING ABOVE REQUIREMENTS	
> 12% Fine Grained: GM, GC, SM, SC	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE with P.I. LESS THAN 4
		ATTERBERG LIMITS ABOVE "A" LINE with P.I. MORE THAN 7
5 to 12% Fine Grained: use dual symbols		



SOIL PARTICLE SIZE

FRACTION	U.S. STANDARD SIEVE			
	Passing		Retained	
	Sieve	Size (mm)	Sieve	Size (mm)
SILT / CLAY	#200	0.075		
SAND				
FINE	#40	0.425	#200	0.075
MEDIUM	#10	2	#40	0.425
COARSE	#4	4.75	#10	2
GRAVEL				
FINE		19	#4	4.75
COARSE		76		19
COBBLES	76 mm to 203 mm			
BOULDERS	> 203 mm			
ROCK FRAGMENTS	> 76 mm			
ROCK	>0.76 cubic meter in volume			

GENERAL GUIDANCE OF SOIL ENGINEERING PROPERTIES FROM STANDARD PENETRATION TEST (SPT)

SANDY SOILS				SILTY & CLAYEY SOILS		
Blow Counts N	Relative Density %	Friction Angle ϕ, degree	Description	Blow Counts N	Unconfined Strength q_u, tsf	Description
0 - 4	0 -15		Very Loose	< 2	< 0.25	Very soft
4 - 10	15 - 35	26 - 30	Loose	2 - 4	0.25 - 0.50	Soft
10 - 30	35 - 65	28 - 35	Medium Dense	4 - 8	0.50 - 1.00	Medium Stiff
30 - 50	65 - 85	35 - 42	Dense	8 - 15	1.00 - 2.00	Stiff
> 50	85 - 100	38 - 46	Very Dense	15 - 30	2.00 - 4.00	Very Stiff
				> 30	> 4.00	Hard

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PLATE A1

BORING NO. B - 1

Logged By: AG Date Drilled: 11/30/18
Drilled By: CN

Depth ft.	Elevation	USCS Code	Description	Sample Loc.	Sample No.	SPT Blow Counts	Water Content %	Other Tests/ Comments
		ML	Dark brown sandy SILT with bark, roots and organic matter, moist, very loose (forest duff)			1,0,1 (N=1)	32.4	
		ML	Tan gravelly very fine sandy SILT, dry medium dense (weathered till)			2,6,11 (N=17)	6.8	Little Recovery (likely due to gravel)
5		ML/SM	Tan very fine sandy SILT grading to gray silty SAND with some gravel, dry to moist, medium dense (weathered till)			3,7,14 (N=21)	9.0	
		SM	Gray gravelly silty SAND, moist, very dense (unweathered till)			14,37,50/5.5" (N>87)	4.9	
10		SM	Gray silty SAND with some gravel, moist, very dense (unweathered till)			24,50/5.5" (N>100)	8.2	
			Depth of boring: 11.5 feet below ground surface (bgs) No groundwater seepage observed Drilling Method: Hollow-stem auger Sampling Method: 2-inch-O.D. standard penetration sampler driven using a 140 lb. hammer with a 30-inch drop (cathead).					
15								
20								
25								

LEGEND:
- 2" O.D. SPT Sampler
- 3" O.D. California Sampler
- Water Level noted during drilling
- Water Level estimated at later time, as noted

GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists, & Environmental Scientists

BORING LOG

NEW RESIDENCE
10823 SE 12TH ST
BELLEVUE, WA

JOB NO. G-4808 **DATE** 12/3/18 **PLATE** A2

BORING NO. B - 2

Logged By: AG Date Drilled: 11/30/18
Drilled By: CN

Depth ft.	Elevation	USCS Code	Description	Sample Loc.	Sample No.	SPT Blow Counts	Water Content %	Other Tests/ Comments
		SM	Dark brown silty SAND with occasional gravel, moist, very loose (forest duff)			1,2,1 (N=3)	13.4	
		SM	with wood or root piece, very loose to loose			1,4,8 (N=12)	8.5	
		ML	Tan very fine sandy SILT, dry, medium dense					
5		SM	Gray gravelly silty SAND, moist, very dense (unweathered till)			21,29,23 (N=52)	5.0	
		SM	Gray gravelly silty SAND, moist, dense (unweathered till)			9,18,23 (N=41)	9.2	
10		SM	Gray gravelly silty SAND, moist, very dense (unweathered till)			22,37,50 (N=87)	7.4	
			Depth of boring: 11.5 feet below ground surface (bgs) No groundwater seepage observed Drilling Method: Hollow-stem auger Sampling Method: 2-inch-O.D. standard penetration sampler driven using a 140 lb. hammer with a 30-inch drop (cathead).					
15								
20								
25								

LEGEND:
- 2" O.D. SPT Sampler
- 3" O.D. California Sampler
- Water Level noted during drilling
- Water Level estimated at later time, as noted

GEO Group Northwest, Inc.
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BORING LOG

NEW RESIDENCE
10823 SE 12TH ST
BELLEVUE, WA

JOB NO. G-4808 **DATE** 12/3/18 **PLATE** A3